

Feb. 25, 1930.

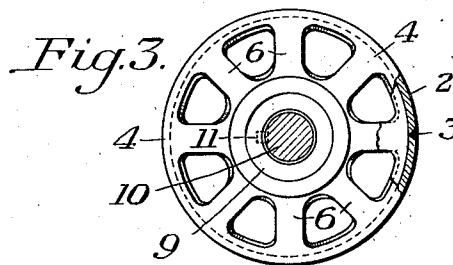
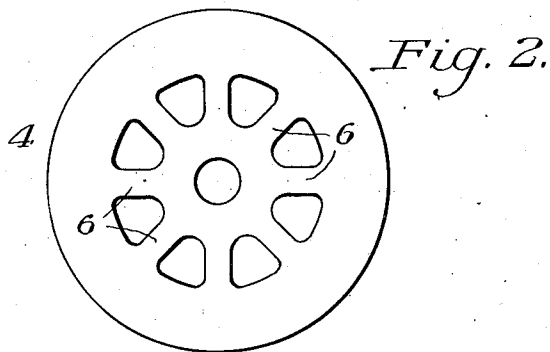
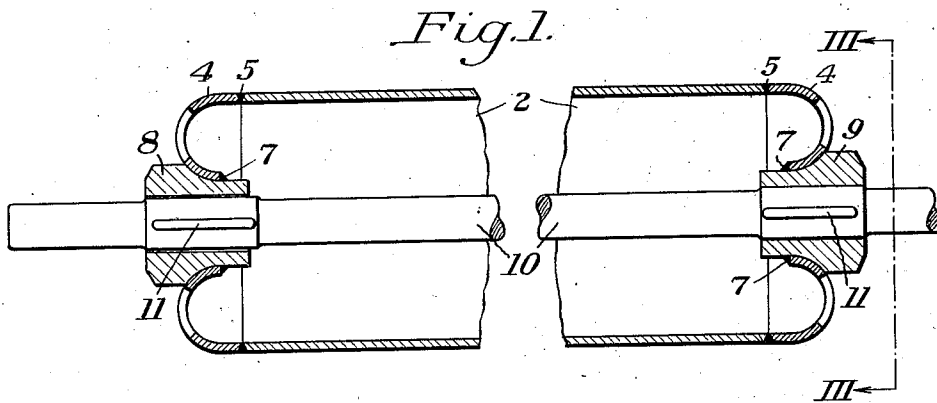
G. L. FISK

1,748,473

TABLE ROLLER

Filed March 25, 1924

2 Sheets-Sheet 1



INVENTOR

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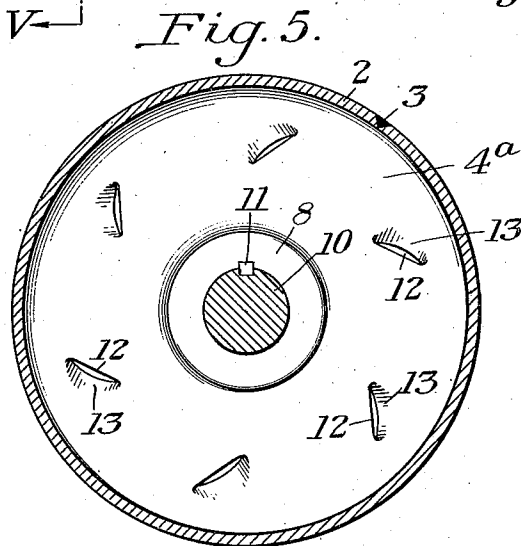
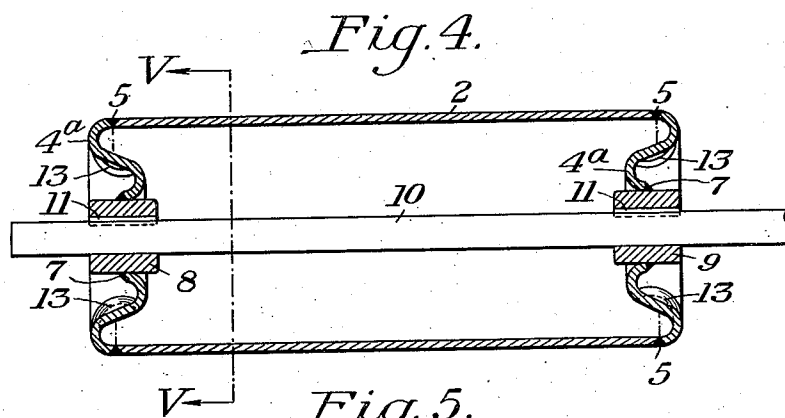
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TABLE ROLLER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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TABLE ROLLER

Application filed March 25, 1924. Serial No. 701,634.

The present invention relates broadly to rollers, and more particularly to rollers for roller tables employed in rolling mills for conveying ingots, blooms, billets and bars to the passes of the rolls and for conveying the mill products from the rolls to the shears, saws, cooling beds or other points of delivery.

The type of roller usually employed at the present time in such roller tables consists of a steel shaft and a cast iron or cast steel roller body machine to fit the shaft. The roller body is made hollow or solid but, in either case, it is heavy in proportion to the duty performed by the roller. Weight is necessary to make sound castings and to avoid breakage in view of the hard usage to which the rollers are subjected. Nevertheless such rollers crack, break and warp. The heavy weight of the rollers calls for a great torque to set and maintain them in motion, requiring the use of motors of sizes entirely out of proportion to the useful work performed in propelling an ingot, a bloom, a billet or a bar.

Table rollers in rolling mills are subject to shocks and blows from the material conveyed or in process of rolling and, due to the rigid construction of rollers now in use, they frequently crack and break. Such rollers are also subject to heating by the hot metal conveyed or in process of rolling, causing the rollers to warp and get out of proper alignment. To ameliorate this difficulty, the roller bodies are made hollow with openings at either end to allow for ventilation by giving the heated air an avenue of escape, or the barrel of the roller is provided with holes to permit free motion of air through the roller body.

Table rollers for less severe service have been made of steel pipe, forming the roller barrel, with cast iron or steel plugs fitting into the ends of the pipe and bored to fit the shaft of the roller. Such rollers can be made somewhat lighter, but, due to lack of flexibility, they are not adapted to withstand heavy blows. Their use, therefore, is limited to conveying of relatively light materials only.

The heavy table rollers now used in the rolling mill industry are expensive and are not readily handled without the use of over-

head cranes. Furthermore, they are the cause of clumsy table design, where a lighter structure could more readily perform the same duty with less power.

My invention provides a durable, light and cheap roller, made possible by providing for flexibility or spring between the roller barrel and the roller shaft. This feature is accomplished preferably by the use of flexible heads secured to the end of the roller barrel and which heads transmit any load imposed on the roller barrel onto the shaft of the roller. Thanks to the flexibility of these heads, they act as springs, and thus cushion the blows received by the barrel on the roller. This feature permits the roller to be made lighter than is now the practice, and permits the use of steel plate or steel pipe for the barrels of rollers subject to heavy duty.

The use of rolled steel plate or steel pipe for the bodies of the rollers eliminates cracking and breaking to a great extent. The light weight of the rollers materially reduces the power required to drive them and reduces friction in the journals and lightens and cheapens the entire table structure. Furthermore, the small wall thickness of the roller barrel permits a more rapid dissipation of the heat absorbed from the metal conveyed.

By making the heads of the roller of such shape that they act as fans when the roller is in motion, air is drawn through the roller barrel, which aids in keeping it cool. Thus the chances of the roller warping are greatly reduced.

Another advantage arising from my invention is that the shocks and blows to the table rollers are cushioned by the rollers and not transmitted to the rest of the table structure. This feature permits the table mechanism to be maintained in better alignment and greatly lengthens its life.

Certain preferred embodiments of my invention are shown in the accompanying drawings, in which—

Figure 1 is a longitudinal section of one form of roller embodying my invention;

Figure 2 shows the flat blank from which

a head is pressed, the blank having been punched to form spokes;

Figure 3 is a section on the line III—III of Figure 1;

5 Figure 4 is a longitudinal section of a modified form of roller; and

Figure 5 is a cross section on the line V—V of Figure 4 on a larger scale.

Referring to the form of the invention illustrated in Figures 1, 2 and 3, the roller barrel 2 is preferably made from a steel plate rolled to a true cylinder and welded longitudinally, as indicated at 3, Figure 3, the barrel being made of metal thin enough to permit of a limited give. The barrel has a head 4 secured to each end thereof by a weld 5, these welds being so located that any distortion of the roller barrel due to heat or shock is least liable to injure the welds.

20 The heads are preferably pressed from steel plates and are made of such shape as to act as springs. In forming a head a flat circular blank, Figure 2, is punched to form spokes or springs 6 sufficiently strong to take the load on the roller, but weak enough to have desired flexibility. Each spoke is made of uniform cross section for a long enough distance so as not to concentrate the give at any one point, which in time would tire out the metal and cause the spokes to crack. The openings between the spokes permit ventilation and cooling of the roller.

After the heads are pressed to shape they are welded at 7 to steel hubs 8 and 9 and then to the roller barrel. The hub 9 is pressed onto the shaft 10 whereas the hub 8 preferably has a slip fit thereon so as to be free to move with the expansion and contraction of the roller barrel. Both hubs, however, are preferably keyed to the shaft, as indicated at 11, and serve to transmit the torque to the roller barrel.

The roller shown in Figure 4 differs from that shown in Figure 1 in that the heads 4^a are shaped to have a reverse curvature and in that ventilating openings 12 are punched therein to provide blades 13 which act as fan blades to increase the circulation of air through the roller.

50 While I have shown and described certain preferred embodiments of my invention, it will be apparent that the invention may be otherwise embodied without departing from the spirit thereof. For example, instead of heads serving as springs, the use of separate springs in one form or another may be substituted, or the ends of the roller barrel instead of the heads may be shaped to furnish desired flexibility. These and other changes are within the scope of the appended claims.

I claim:

1. In a roller, the combination of a shaft and a hollow roller body, the roller body comprising a barrel portion of material strength and thickness and radially extend-

ing portions connecting the barrel portion to the shaft, said radially extending portions being so formed as to permit the barrel portion to yield bodily with respect to the shaft while substantially maintaining its original form.

2. In a roller, the combination of a shaft and a hollow roller body, the roller body comprising a barrel portion of substantial strength and thickness and end portions connecting the barrel portion to the shaft, the end portions having a curvature so as to permit the barrel portion to yield bodily with respect to the shaft while substantially maintaining its form.

3. In a roller, the combination of a shaft and a hollow roller body comprising a barrel portion and annular end portions which are curved in cross section, the roller body being relatively stiff and the end portions permitting lateral displacement of the barrel portion with respect to the shaft when a load is applied to the barrel portion.

4. In a roller, the combination of a shaft, a hub secured to the shaft, and a hollow roller body having a flexible head of curved section secured to the hub, the head being adapted to permit lateral displacement of the roller body relative to the shaft when a load is applied to the roller body.

5. In a roller, the combination of a shaft, a pair of hubs carried by said shaft and fixed against rotation with respect thereto, one of said hubs being adapted to have sliding movement on said shaft, a roller barrel, and flexible heads secured to said hubs and to the ends of said barrel and forming continuations thereof which merge smoothly therewith.

6. In a roller, the combination of a shaft, a hub secured to said shaft, and a roller body consisting of a barrel portion formed from a steel plate rolled into cylindrical form and welded and a head formed from a steel plate and welded to said barrel and hub, said hub being curved in transverse section whereby to act as a spring between said barrel and hub.

7. In a roller, the combination of a shaft, hubs carried by said shaft and fixed against rotation with respect thereto, a roller barrel, and heads welded to the opposite ends of said barrel and to said hubs, each of said heads consisting of an annular plate curved in transverse section whereby to act as a spring between said barrel and the hub to which it is connected.

8. In a roller, a combination of a shaft and a hollow roller body, the body comprising a barrel portion having a substantially uninterrupted periphery and radially extending end portions which are curved in cross section and connect the shaft and the barrel portion, the barrel portion being relatively unyieldable and the end portions permitting

displacement of the barrel portion with respect to the shaft when a load is applied to the barrel portion.

5 9. In a table roller, the combination of a shaft, a relatively long roller barrel and radially extending portions adjacent the ends of the barrel portion connecting the shaft and the barrel portion, said end portions being independently yieldable so that either end
10 of the barrel portion may be displaced with respect to the shaft depending upon the point of application of a load to the barrel portion.

In testimony whereof I have hereunto set my hand.

15 GUSTAF L. FISK.

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